

WHAT IS CLAIMED IS:

1 1. A magnetic head having a write function, comprising:
2 a lower core including a plurality of layers;
3 an upper core including a plurality of layers;
4 a lower core edge layer included in the lower core; and
5 an upper core edge layer included in the upper core, the lower core edge layer and
6 the upper core edge layer defining a write gap on a side of an air bearing surface;
7 wherein the lower core except for the lower core edge layer is recessed from the
8 air bearing surface of the magnetic head and has a flare structure.

1 2. The magnetic head according to claim 1, wherein an insulating film is formed
2 on the lower core except for the lower core edge layer on a side of the air bearing surface.

1 3. The magnetic head according to claim 1, wherein a three-layer pole piece
2 having the lower core edge layer, the upper core edge layer, and a write gap layer formed
3 between the lower core edge layer and the upper core edge layer is configured such that a width
4 in the track width direction of a side opposite to the side of the air bearing surface is larger than a
5 width in the track width direction on the side of the air bearing surface.

1 4. The magnetic head according to claim 1, wherein a non-magnetic layer in the
2 write gap between the lower core edge layer and the upper core edge layer is formed such that a
3 thickness of a region opposite to a side of the air bearing surface is larger than a thickness of a
4 region on the side of the air bearing surface.

1 5. A magnetic head having a write function, comprising:
2 a lower core having a first lower pole piece formed under coils and a second
3 lower pole piece formed under a write gap layer; and
4 an upper core having a first upper pole piece formed above the coils and a second
5 upper pole piece formed above the write gap layer;
6 wherein the second lower pole piece is recessed from an air bearing surface of the
7 magnetic head and has a flare structure.

1 6. The magnetic head according to claim 5, wherein:

2 a patterned magnetic material is formed between the first lower pole piece and the
3 second lower pole piece, and

4 the first lower pole piece is recessed from a facet of the patterned magnetic
5 material on a side of the air bearing surface of the magnetic head.

1 7. The magnetic head according to claim 5, wherein:

2 the patterned magnetic material is formed between the first upper pole piece and
3 the second upper pole piece, and

4 the first upper pole piece is recessed from a facet of the patterned magnetic
5 material on a side of the air bearing surface of the magnetic head.

1 8. The magnetic head according to claim 5, wherein a three-layer pole piece

2 having the second lower pole piece, the second upper pole piece, and the write gap layer formed
3 between the second lower pole piece and the second upper pole piece is configured such that a
4 width in a track width direction of a side opposite to a side on the air bearing surface of the
5 three-layer pole piece is larger than a width in the track width direction on the side of the air
6 bearing surface.

1 9. The magnetic head according to claim 5, wherein the write gap layer is a non-

2 magnetic layer formed such that a thickness of a region opposite to a side of the air bearing
3 surface is larger than a thickness of a region on the side of the air bearing surface.

1 10. The magnetic head according to claim 5, wherein a non-magnetic film pattern

2 is formed at least under the second lower pole piece or above the second upper pole piece, and
3 the non-magnetic film pattern has its facet located at a position recessed from the air bearing
4 surface.

1 11. The magnetic head according to claim 5, wherein a magnetic film is formed

2 as an underlying layer under the second lower pole piece.

1 12. A magnetic head having a write head, comprising:

2 a multi-layer lower core including a lower core edge layer; and

3 a multi-layer upper core including an upper core edge layer;

4 wherein:

5 the lower core edge layer and the upper core edge layer define a write gap on a
6 side of an air bearing surface; and
7 the lower core except for the lower core edge layer is recessed from the air
8 bearing surface of the magnetic head and has a flare structure.

1 13. The magnetic head according to claim 12, wherein an insulating film is
2 formed on the lower core except for the lower core edge layer on a side of the air bearing
3 surface.

1 14. The magnetic head according to claim 12, and further comprising a write gap
2 layer formed between the lower core edge layer and the upper core edge, the lower core edge
3 layer, the upper core edge layer, and the write gap layer defining a three-layer pole piece;
4 the three-layer pole piece being configured such that a width in the track width
5 direction of a side opposite to the side of the air bearing surface is larger than a width in the track
6 width direction on the side of the air bearing surface.

1 15. The magnetic head according to claim 12, and further comprising a non-
2 magnetic write gap layer between the lower core edge layer and the upper core edge layer;
3 the non-magnetic write gap layer being formed such that a thickness of a region
4 opposite to a side of the air bearing surface is larger than a thickness of a region on the side of
5 the air bearing surface.

1 16. A magnetic head having a write head, comprising:
2 a set of coils;
3 a lower core having a first lower pole piece formed under the coils;
4 a non-magnetic write gap layer;
5 a second lower pole piece formed under the write gap layer; and
6 an upper core having a first upper pole piece formed above the coils and a second
7 upper pole piece formed above the write gap layer;
8 the second lower pole piece is recessed from an air bearing surface of the
9 magnetic head and has a flare structure.

1 17. The magnetic head according to claim 16, wherein:

2 a patterned magnetic material is formed between the first lower pole piece and the
3 second lower pole piece, and

4 the first lower pole piece is recessed from a facet of the patterned magnetic
5 material on a side of the air bearing surface of the magnetic head.

1 18. The magnetic head according to claim 16, wherein:

2 the patterned magnetic material is formed between the first upper pole piece and
3 the second upper pole piece, and

4 the first upper pole piece is recessed from a facet of the patterned magnetic
5 material on a side of the air bearing surface of the magnetic head.

1 19. The magnetic head according to claim 16, wherein:

2 the second lower pole piece, the write gap layer, and the second upper pole piece
3 define a three-layer pole piece that is configured such that a width in a track width direction of a
4 side opposite to a side on the air bearing surface of the three-layer pole piece is larger than a
5 width in the track width direction on the side of the air bearing surface.

1 20. The magnetic head according to claim 16, wherein the write gap layer is

2 formed such that a thickness of a region opposite to a side of the air bearing surface is larger than
3 a thickness of a region on the side of the air bearing surface.

1 21. The magnetic head according to claim 16, wherein:

2 a non-magnetic film pattern is formed at least under the second lower pole piece
3 or above the second upper pole piece, and

4 the non-magnetic film pattern has its facet located at a position recessed from the
5 air bearing surface.

1 22. The magnetic head according to claim 16, wherein a magnetic film is formed

2 as an underlying layer under the second lower pole piece.